Phonological Phrases in Kikuyu

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This study examines two different floating L tones (\(L\)) in Kikuyu (Bantu E51): A lexical \(L\) and a phrasal \(L\) which appears in assertive utterances. Based on previous studies, this paper proposes a unified analysis of the domain of the two floating L tones within the syntax-phonology interface. The main claim is that they attest different strategies to trigger downstep at the right edge of a phonological phrase while no downstep is triggered internally of this domain. New data and different configurations with nominal modifying adjectives is discussed with the outcome that adjectives which follow other modifiers phrase alone. This is conform with the proposed analysis when taking the syntax of adjectives in Kikuyu into consideration.

1. Introduction

Kikuyu is a Bantu language spoken in the Central Province of Kenya. It is one of the largest languages in Kenya with more than 6.6 million speakers (Lewis et al. 2015). There are five dialects in Kikuyu. This study is based on Southern Kikuyu and Northern Kikuyu.

Kikuyu is an SVO language in which modifiers follow the head. It is a highly agglutinative language with noun class prefixes which agree in gender. The verb is composed by a root, subject- and object prefix and combining morphemes for tense and aspect. Kikuyu is a tone language with an underlying /H L Ø/ tonal distinction and with rising and falling contour tones.\(^1\) The syllable is the Tone Bearing Unit (TBU) and every TBU in Kikuyu has a surface tone. The syllable can be V, CV, NCV, NCGV.\(^2\) Two adjacent vowels can either count as one syllable or as two syllables. To disambiguate, I follow Clements (1984b) in annotating only the latter vowel for tone when they form one syllable. Thus, \(VV\) should be considered one \(H\)-toned syllable (as opposed to a \(LH\) sequence). The underlying \(Ø\) tones are annotated with a \(L\) tone on the surface.

Most of the data in this study is based on recordings of two Kikuyu speakers. The data cited from Clements (1984b) or Clements & Ford (1981) was also reproduced and recorded.

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\(^1\) H(igh) tones are annotated with an acute accent, L(ow) tones with a grave accent, rising tones with a circumflex and falling tones with a caret. Toneless syllables are not annotated in underlying representation.

\(^2\) Abbreviations are V(owel), C(onsonant), N(asal) G(lide).
acoustically. The exceptions to this are examples (13) and (41) as they were added after the recording period was finished. The reproductions are conform with the original sources. Finally, most of the data in section 6 are examples from Mugane (1997) which mainly regard the syntax of the nouns and modifiers. They are not annotated with tone because they are omitted in the source and were not part of the recordings for this study.

Kikuyu attests a number of tone rules. The ones relevant for this study are High Tone Spreading (HTS), NON-FINALITY and floating L tones which trigger downstep (\(\ddot{\text{L}}\)) on surface H and L tones in specific syntactic configurations. Altogether, Kikuyu is a highly complex tone language, not untypical for a Bantu language. There are two types of floating L tones: A lexical one and a phrasal one. The lexical floating L tone appears in final position in nouns, modifiers and adverbs. Whether or not it is underlying depends on the tonal pattern of the word. The phrasal floating L tone appears with all verbs of assertion and I claim here that it is an assertive morpheme. I will refer to the two tones as ‘(lexical) \(\text{L}\)’ and ‘(assertive) \(\text{L}\)’, where the latter is marked in bold. This font distinction is also used in the examples to distinguish the two floating L tones. The lexical \(\text{L}\) does not appear with verbs. Conversely, an underlying assertive \(\text{L}\) appears with all kinds of lexical verbs and does also not depend on the tense or aspect of the verb.

In (1),\(^3\) the noun \(\text{N} \text{Omb}\) ‘cattle’ has a final lexical \(\text{L}\) which triggers downstep on the following syllable: the L-toned coordinator \(\text{n`a}\). Downstep lowers the pitch of \(\text{n`a}\). The patterns in (1) can be contrasted with (2) where a modifier follows the noun and no downstep is triggered.

\begin{itemize}
\item[(1)] /\(\text{N} \text{Omb}\text{L} n`\text{a} \text{r`i`a}/\quad\text{nominal subject - coordinator: } \text{L} \rightarrow \{\ddot{\text{L}}\}
\begin{align*}
\text{\(\text{y`ak`E}\text{h`O\text{r`i}\text{L}}\)}&
\text{9.cattle and 5-milk} \\
\text{\(\text{\`i\text{n\text{r`i`a}}...}\)}&
\text{‘cattle and milk’}
\end{align*}
\text{(Clements & Ford 1981:328)}
\item[(2)] /\(\text{N} \text{Omb}\text{L} \text{y`ak`E}\text{h`O\text{r`i}\text{L}}/\quad\text{noun - modifier: } \text{L} \rightarrow \emptyset
\begin{align*}
\text{\(\text{\text{y`a-k`E}\text{h`O\text{r`i}}\)}&
\text{9.cattle 9-3SG gentle} \\
\text{\(\text{\text{n`a\text{r`i`a}}...}\)}&
\text{‘his gentle cattle (is inside the house)}’
\end{align*}
\end{itemize}

If a second modifying adjective follows a head noun and an adjacent adjective like in (3), downstep will be triggered on the final adjective if the preceding one has an underlying lexical \(\text{L}\). In this configuration, downstep is only triggered if the preceding modifier has a final \(\text{L}\). If it does not have one, no downstep appears.

\begin{itemize}
\item[(3)] /\(\text{N} \text{Omb}\text{L} \text{nd\text{t`o}\text{L} \text{h`O\text{r`i}\text{L}}}/\quad\text{modifier – modifier } \text{L} \rightarrow \{\ddot{\text{L}}\}
\begin{align*}
\text{\(\text{\text{y`om\text{b`e}} \text{\text{nd\text{t`o}}\text{h`O\text{r`i}}\text{L}}\)}&
\text{9.cattle 9-heavy gentle} \\
\text{\(\text{\text{\`i\text{h`O\text{r`i}}}}\)}&
\text{‘a heavy gentle cattle’}
\end{align*}
\end{itemize}

\(^3\) Clements (1984b) argues for the existence of a grammatical \(\text{L}\) which appears in certain tenses and blocks the two rules High Tone Spreading and Flattening. It is different from the assertive \(\text{L}\) and the lexical \(\text{L}\) in that it cannot trigger downstep and it is not domain-sensitive.

\(^4\) IPA symbols are used here for the language examples. The underlying tones are shown in the first line of the glossed example while the surface tones are shown in the second line. The abbreviations for the glossings follow the Leipzig Glossing rules with the exception of the following ones: CONN – connective, FM – focus marker, FV – final vowel, NPST – near past, NFUT – near future, NZER – nominalizer, SM – subject marker.
With an assertive verb, downstep is triggered after the object to the immediate right of the verb if there is one. In (4), downstep appears on the first syllable of the adjunct ḍeĩnè... ‘inside’. The source of the downstep is the asserting floating L tone of the verb.

(4) /nd`Oːn`ir`E  mɔyɛ̀rɛniá ḍeĩnè wá ɲòmbá/
d-ɔn-ir-ɛ mɔ-ɣɛ̀rɛniá ḍeĩnè wá ɲòmbá
SM-see-PFV.FV 1-examiner inside CONN 9.house
‘I saw the examiner inside the house.’ (Clements & Ford 1981:327)

The tone patterns of Kikuyu have previously been examined by Clements & Ford (1979, 1981); Clements (1984b); Philippson (1991), among others. Based on the work of these authors, this paper proposes a unified analysis for floating L tones and the surface positioning of downstep from a syntax-phonology approach within the framework of Optimality Theory. The analysis will account for the positioning of both the lexical floating L tone as well as the assertive one which appears with the verb. The claim of this study is that the two floating L tones, which are underlingly in different positions in the clause, only trigger downstep at the right edge of a phonological phrase (p-phrase). P-phrase medially they either get deleted (= lexical [L]) or they shift (= assertive [L]). From the shifted position, the assertive [L] can trigger downstep. In this sense, both of the floating L tones are domain-sensitive in that they can get deleted or shift according to constituency.

This paper is structured as follows: In section 2, data will be shown where the different surface patterns of the floating L tones are described in detail. Section 3 goes systematically through the different configurations where syntactic downstep is triggered and where it does not appear. Section 4 gives a brief introduction to the syntax-phonology interface. Section 5 proposes a unified analysis for the syntactic distribution of the two floating L tones. Section 6 presents some apparent problems regarding the phrasing of the adjectives and attempts to account for this regarding the structure of the Determiner Phrase (DP). Section 7 concludes the paper.

2. Three Effects of floating L tones

The data was recorded in Berlin in 2014 and comes from a southern and a northern Kikuyu speaker. The recordings were made in a phonetic laboratory with an anechoic chamber. The microphones used for the recording were a Sennheiser ME 64, an MKH 20-P48 and a Beyerdynamics Opus 54.16. The sampling rate was 44.1 KHz with 16-bit quantization. The recorders which were used were a Tascam DA-20 MKII and a Behringer Ultragain MIC 2000.

The recordings were made to examine the properties of the two floating L tones in Kikuyu. Firstly, they interact with surrounding tones. Secondly, they can trigger downstep on both surface H and L tones. Thirdly, they are domain sensitive. Downstep in Kikuyu affects tones by bringing their F0 values down to a perceivable lower tone. Clements & Ford (1981) found that downstep can be triggered on surface H and L tones and cause a pitch lowering which results in

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5 For reasons of consistency, the examples deviate from this source in that /oa/ is annotated as /wa/, /c/ as /s/, and /ʃ/ as /ʃ/. 
a one level drop: a downstepped H tone will correspond to the pitch height of a L tone and the
pitch drop between a L tone and a downstepped L tone will be as big as the difference between
a H and a L tone. This has been referred to as total downstep (cf. Meeussen 1970).

There are three phenomena which indicate the presence of the underlying floating L tones
in Kikuyu: (i) Downstep, (ii) Blocking of the rule NON-FINALITY, and (iii) Unbounded HTS.
These phenomena are all based on Clements (1984b); Clements & Ford (1981); Philippson
(1991) and will be described below.

2.1. Downstep

A floating L tone can trigger downstep on both H and L tones in the sequences H_H, L_H, and
L_L. As will be shown in section 2.3, the sequence H_L is banned in Kikuyu. In (5), downstep
appears in a H tone sequence: H_H and lowers the H tone of the copula ní to the level of a
L tone. This results in a register lowering so that the following L tone mwè- also drops and
contrasts with the downstepped copula.

(5) /ŋóŋóňá(m)(ní)(mwè-ýá)
ŋóŋóňá *ní mw-ýá
Njúgúna COP 2-good
‘Njúgúna is good.’

Downstep in a L_H sequence is found in (6). Downstep lowers the initial H tone of the noun
ŋó́tá ‘star’ to the register of the preceding L. The effect of this is that downstep evens out the
L-H F0 contrast between the L-toned -kti and H-toned ŋóá-.

(6) /áh-írë(m) mwánèkí(ŋó́tá)
á-hë-írë mwánèkí *ŋó́tá
SM-give-PFV.FV Mwaniki 9.star
‘He gave Mwaniki a star.’ (Clements and Ford 1981:315)

Finally, downstep applies in a L tone sequence: L_L. In (7) downstep is triggered on the L-
initial hwàké by an underlying floating L tone.6 In the recorded data, the F0 drop between the
downstepped L tone and the preceding L tone correspond roughly with a HL pitch drop. This is

(7) /nðë-rà-ýóù-írë(ŋómbè(m) hwàké)
ndë-rà-ër-írë qýmbè *hwàké
SM-NPST-buy-PFV.FV 9.cattle yesterday.evening
‘I bought cattle yesterday evening.’

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6 The source of downstep is both lexical and assertive, i.e., both tones are predicted to trigger downstep here
as will be explained later, but only one downstep surfaces.
2.2. Non-finality

The second evidence for an underlying floating L tone comes from interaction with another tone process which I will refer to as NON-FINALITY. This constraint corresponds to the originally proposed rule ‘Flattening’ (Clements & Ford 1981; Clements 1984b). NON-FINALITY is an OT constraint which bans H tones on a domain edge (Yip 2002; Cassimijee and Kisseberth 1998). In Kikuyu, NON-FINALITY is active in that it lowers a H tone in a prosodic domain which is higher than the p-phrase, i.e. the Intonation Phrase (i-phrase) or the Prosodic Utterance (p-utterance).\(^7\)

Words pronounced in isolation will be affected by NON-FINALITY as they are i-phrase-final/p-utterance-final. Thus, words ending in a H tone or a rising tone will be lowered to L. This applied in (4) to the noun pomboka which lowered its final rising tone to L. The same process is shown below. The noun wambogó retains its underlying H tone in sentence-medial position (8). NON-FINALITY applies to the sentence-final word mwéyá which lowers its final H tone. In (9a), the H tone of wambogó is lowered to L when pronounced in isolation. Crucially, when a lexical (\(\text{L}\)) is final in a word, NON-FINALITY does not apply. The same goes for the assertive (\(\text{L}\)). The explanation for this is that NON-FINALITY only applies to H tones which are domain-final.

When a floating L tone follows the final H tone such as (...H\(\text{L}\)) in (9b) where the proper noun kamaú is followed by a lexical (\(\text{L}\)), NON-FINALITY will be blocked. The reason for this is that the H tone no longer counts as the final item, the floating L tone does (Clements 1984b).

(8) /yorerá wambóyó móýká mwéyá/ H tone retained sentence medial
    yó-er-á wambóyó móýká mwéyá
    IMP:buy-for-FV Wambógó 3-rug 3-good
    ‘Buy Wambógó a good rug!’ (Clements 1984b:288)

(9) a. /wambóyó/ Application of NON-FINALITY
    wambóyó
    ‘Wambuú’

b. /kamaú(\(\text{L}\))/ Blocking of NON-FINALITY
    kamaú
    ‘Kamau’ (Clements 1984b:288)

2.3. Unbounded HTS

The third indication of a a floating L tone regards HTS. In Kikuyu, HTS is binary and a H tone can spread one syllable to the right but not further. Data shows that binary HTS applies across word boundaries in a domain which is larger than the p-phrase.\(^8\) This is shown in (10a) where the underlying L-toned coordinator nà is raised to H by the preceding H-final jàuyá. The H tone spreads no further and the following noun pçóyóná remains L-initial. This contrasts to

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\(^7\) According to Clements (1984b), Flattening applies in clause-final position and the exact domain of this rule/constraint is not clear

\(^8\) Generally it applies from a head onto a complement but also from a primary object onto a secondary object or onto an adjunct. Whether the domain of HTS is the i-phrase or the p-utterance remains open for future research.
the example in (10b), where the assertive \( \text{L} \) is now present underlyingly. Due to a separate rule which will be explained later, \( \text{L} \) shifts and shows up after the primary object \( n\acute{a}g\acute{a} \). Thus, the intermediate step in the derivation is: \( /\text{nd\text{"e}-rå:rö-rir\text{"e}}\text{\text{"e}}\, n\acute{a}g\acute{a}\text{\text{"e}}/ \) where the floating tone appears in the sequence \( H\text{–L} \). The crucial point here is that downstep is not triggered on the L tone. Instead, \( \text{L} \) triggers downstep on the H-toned \( o \) in \( p\acute{o}y\acute{o}n\acute{a} \) and HTS has applied to both \( n\acute{a} \) and \( p\acute{o} \), exceeding the canonical binary HTS. Clements & Ford (1981) refer to this as ‘Downstep Displacement’ or ‘Block Raising’ which they say applies in correlation with downstep. Philippson (1991) analyzes this as an effect of the floating L tone which moves rightwards until it finds a H tone deleting the underlying L tones on the way. This allows for unbounded HTS as oppose to the canonical binary HTS which normally only applies to one syllable. When there is no underlying H tone for the floating L tone to trigger downstep on like in \( p\acute{o}y\acute{o}n\acute{a} \), unbounded HTS applies until clause-final position. In this case no downstep will be triggered but unbounded HTS is an indicator of the presence of an underlying floating L tone (cf. Philippson 1991). Examples of this come in section 6.

(10) a. \( /n\acute{a}g\acute{a} \, n\acute{a} \, p\acute{o}y\acute{o}n\acute{a}\text{\text{"e}}/ \) Binary HTS without \( \text{L} \)

\[ n\acute{a}g\acute{a} \, n\acute{a} \, p\acute{o}y\acute{o}n\acute{a} \]

‘Ng’ang’a and Njũgũna

b. \( /\text{nd\text{"e}-rå:rö-rir\text{"e}}\text{\text{"e}}\, n\acute{a}g\acute{a} \, n\acute{a} \, p\acute{o}y\acute{o}n\acute{a}\text{\text{"e}}/ \) Unbounded HTS with \( \text{L} \)

\[ n\acute{a} \text{–PST} -\text{watch-}PFV \, Ng’ang’a \text{ and Njũgũna} \]

‘I watched Ng’ang’a and Njũgũna.’

The unbounded HTS in correlation with a floating L tone (lexical or assertive) can be seen as a strategy to avoid the double pitch drop which arises with downstep on a L tone when a H is preceding (Clements & Ford 1981). Indeed, the following sequence is unattested: \( [H^1L] \). For this paper, it will only be relevant that unbounded HTS is an indication of an underlying floating L tone. My claim here is that whether downstep or unbounded HTS is triggered is only conditioned by surrounding tones.

Overall, downstep, NON-FINALITY, and unbounded HTS are three possible indicators of an underlying floating L tone. This makes it possible to keep track of where it moves due to constituency as will be shown in section 4. In the next section, a short description of the two different floating L tones will be given.

3. Two different floating L tones

There are two different floating L tones in Kikuyu which are domain-sensitive and can trigger the three tone processes described in section 2: a lexical \( \text{L} \) and an assertive \( \text{L} \). These will be described below.
3.1. Lexical floating L

The presence of a final lexical L depends on the tonal pattern of a word. The contrast between a noun with a lexical L and one without is visible in (11). In (11a), the noun ṭaṭa has no underlying floating L tone and therefore no downstep is triggered on the copula. In (11b) (also showed in (5)), the noun ṭoṭoṇa does have an underlying floating L tone at the end of its tonal pattern which triggers downstep on the following H-toned copula nê. The downstep lowers the pitch of the H-tone nê while in (11a) the H tone has the same level as the final H tone of the preceding word ṭaṭa. The reader should note that both sentences in (11) have an assertive L final in the copula. This is irrelevant for this example but its appearance will be explained in the next subsection.

(11) a. /ṭaṭa nêL mwèγá/  
    ṭaṭa nê mw-̀γá  
    ‘Ng’añ’a COP 2-good  
    ‘Ng’añ’a is good.’

b. /ṭoṭoṇaL nêL mwèγá/  
    ṭoṭoṇa nê mw-̀γá  
    Njūgūna COP 2-good  
    ‘Njūgūna is good.’

3.2. Assertive floating L

Data from Clements & Ford (1981) as well as new data from this study gives evidence of a phrasal floating L tone which appears in correlation with assertive speech acts. Clements & Ford (1981) have previously described it as a suffix which appears with affirmative verbs. Their terminology is somewhat indirect as they say that downstep appears in ‘affirmative main clauses’ and they consider assertion to be a main clause affirmative feature (c.f. Clements 1984b). Because this floating L tone appears in negative as well as affirmative verbs (cf. Gjersøe 2015:56). My proposal is that the phrasal floating L tone is an assertive tonal affix. It does not occur in imperative clauses, ex-situ wh-questions or polar questions. Indeed these are speech acts of quest and order. An example from an imperative clause was shown above in (8) where the verb has no underlying L.9 There is also absence of the floating L tone in subordinate clauses: in the subjunctive, conditional, relative and consecutive verb forms. This is conform with the standard assumption that assertion is canonically a property of the main clause (c.f. Hooper & Thompson 1973; Green 2000, among others). In (12), the contrast between a main clause assertion, where the assertive L is present (12a), and a relative clause, where the assertive L is absent (12b), can be observed. In both examples, the object noun mò-kândá is H-final and also lacks a lexical L in its tone pattern. The difference to be noted regards its final H tone which is retained in (12a) because of the underlying assertive L in the verb. In (12b) on the other hand, mò-kândá

9 See Gjersøe (2015) for examples of ex-situ wh-questions and polar questions.
is subject to NON-FINALITY.\(^{10}\) NON-FINALITY applies in (12b) because there is no assertive \(L\) in the relative clause (and also no lexical \(L\)). (12a) can be explained by a rule in Clements & Ford (1981) where the assertive \(L\) shifts and is placed after a following object if there is one (the same applied in (4), (5), (6), (7), (10b) and (11a)). With this rule in mind, there is evidence for the assertive \(L\) if one looks at the final tone of the primary object: \(mò-kândá\). This noun is not subject to NON-FINALITY and the only thing that can block this is an underlying floating \(L\) tone. Because this noun does not have a lexical \(L\), it must be the assertive \(L\). The reason why it shifts and appears after the object will be accounted for in section 6. For now, it should just be noted that verbs which appear in assertion have a \(L\).\(^{11}\) Another important point is that if a floating \(L\) tone appears utterance final, it will only block NON-FINALITY (in case of a H-final word). It will not associate to any TBU nor will it trigger downstep on any tone to the left.

\[
\begin{align*}
\text{(12) a.} & \quad /nè máròràyà\bar{L} mòkàndà/ \quad \text{Assertive (}L) \\
& \quad nè má-ròr-àyà \quad mò-kàndà \\
& \quad \text{FM SM-look.at-IPFV.FV} \quad 3\text{-rope} \\
& \quad \text{‘They look at a rope.’} \\
\text{b.} & \quad /àndò(\bar{L}) màròràyà mòkàndà/ \quad \text{No assertive (}L\) \\
& \quad â-ndò ‘mà-ròr-àyà \quad mò-kàndà \\
& \quad 2\text{-people SM;REL-look.at-IPFV.FV} \quad 3\text{-rope} \\
& \quad \text{‘People who look at a rope.’} \quad \text{(Clements 1984b:316)}
\end{align*}
\]

The example in (13) below is an apparent counterexample which actually strengthens the claim that \(L\) marks assertion. Here, downstep is triggered on the adjunct \(ðeínè\)... The only possible source of this downstep is an assertive \(L\) because the noun \(moỳrànìà\) does not have a lexical \(L\) in its tone pattern (cf. Clements & Ford 1981:320).\(^{12}\) Indeed, this downstep is triggered by the assertive \(L\) which appears underlyingly in the subordinated verb \(nìdòmì̀\). It was just stated that subordination is typically not considered assertions and therefore a \(L\) would not be expected in a subordinate verb. However, because of the matrix verb (\(ësízià\) ‘think’), the subordinated verb is an assertion: A verb such as ‘think’ in (13) may be referred to as ‘adsentential bridge verbs’ which can take sentential complements (cf. Bresnan 1968). Hooper and Thompson (1973) claim that such verbs are non-factive and belong to a group of verbs which take complements and can express an assertion. In this sense, the meaning of the main clause verbs just reflects the speakers attitude and the subordinate clause expresses the assertion.

\[
\begin{align*}
\text{(13) /mwànèkì(\bar{L}) ësízià(\bar{L}) ãtè nè ndòmì̀(\bar{L}) moỳrànìà ðeínè wà} & \quad \text{pömба/} \\
& \quad mwànèkì ‘ësí-sízi-à \quad 4\text{-atè} \quad \text{nè nd-̀sm-irè} \quad \text{mó-̀ỳrànìà ðeínè wà} \quad \text{pömба} \\
& \quad \text{Mwanìki SM-think-FV that FM SM-see-PFV.FV 1-examiner inside CONN 9.house} \\
& \quad \text{‘Mwanìki thinks that I saw the examiner inside the house.’} \quad \text{(Clements & Ford 1981:327)}
\end{align*}
\]

\(^{10}\) The relative form is marked with tone.

\(^{11}\) An alternative analysis of this pattern has been proposed where the assertive \(L\) is present underlyingly, independent of speech acts, and it is then claimed to be deleted as a reflex of movement (cf. Clements 1984a; Murphy (2015))

\(^{12}\) The two other floating \(L\) tones in the main clause are not possible sources of the downstep in the subordinate clause because they are in another domain. Indeed they trigger downstep on their adjacent syllables.
This section showed the difference between the lexical \( \text{\textit{L}} \)s and the assertive \( \text{\textit{L}} \)s. The next section gives a brief introduction to the syntax-phonology interface and p-phrases.

4. P-phrases

The data given so far indicates that the two different floating L tones in Kikuyu are domain-sensitive. Between a noun and a modifier, the lexical \( \text{\textit{L}} \) is deleted and no downstep appears. Contrastingly, the assertive \( \text{\textit{L}} \) is underlingly associated with the verb and its positioning is determined by constituency. In other words, the assertive \( \text{\textit{L}} \) is domain-sensitive in that it shifts position and triggers downstep in a position which can differ from where \( \text{\textit{L}} \) is underlingly. The lexical \( \text{\textit{L}} \) is domain-sensitive in that it gets deleted or not depending on constituency.

In the work on syntax-phonology interface, phonological rules have proved to be domain-sensitive in a number of languages cross-linguistically. As discussed by Kisseberth & Odden (2003), many Bantu languages attest tonal processes which are domain-sensitive. In several cases tone sandhi can indicate the phrasal relations between words. For example Zinza (E23) attests tone sandhi in that a H tone on a verb is deleted if the following word is a complement (Odden 2000). In Tsonga (S53) along with many Bantu languages, HTS applies between the verb and the following object (Kisseberth 1994).

A way to account for such patterns has been the Edge-based approach in the indirect syntax-phonology interface (Selkirk 1986, 1995, 2000; Kanerva 1990; Truckenbrodt 1995, 1999). This theory assumes the existence of a prosodic hierarchy (c.f. Selkirk 1980a, 1980b, 1986; Nespor & Vogel 1986). Prosodic phonology is structured in different levels below and above the word. The prosodic constituents correspond to different syntactic constituents. I follow the standard assumption for this theory that there is an indirect mapping between syntax and phonology. This is stated in the Indirect Reference Hypothesis in (14).

(14) \textit{Indirect Reference Hypothesis} (Inkelas 1989)

Phonological rules refer to only prosodic constituent structure.

The Indirect Reference Hypothesis ensures that there is an indirect mapping between syntactic constituents and prosodic constituents. The prosodic constituent relevant for this study is the p-phrase. The p-phrase is above the word-level in the prosodic hierarchy and it maps with the syntactic phrase. This is stated in (15).

(15) \textit{XP-to-P Mapping Condition} (Truckenbrodt 1999)

Mapping constraints relate XPs to p-phrases, but do not relate XPs to other prosodic entities.

The essential criteria for determining a prosodic constituent is the notion of edges. It is assumed that the edge of a syntactic constituent maps with the edge of a prosodic constituent. For p-phrases it is the maximal projection (XP) which triggers a prosodic boundary. In the syntax-phonology interface, Selkirk (1995) proposes alignment constraints based on the Generalized Alignment family in OT (c.f. McCarthy and Prince 1993).
a. \(\text{Align-XP,R: ALIGN(XP, R; P, R)}\)  
“For each XP there is a P such that the right edge of XP coincides with the right edge of P.”

b. \(\text{Align-XP,L: ALIGN(XP, L; P, L)}\)  
“For each XP there is a P such that the left edge of XP coincides with the left edge of P.”

The final matter which is important for the analysis in Kikuyu regards the nature of the constituents which trigger a prosodic boundary. Selkirk (1995) states that only lexical categories are visible for prosodic boundaries. This means that functional projections do not relate to the syntax-prosody mapping. This is stated in the The Lexical Category Condition in (17).

(17) \(\text{The Lexical Category Condition (LCC)}\)  
Constraints relating syntactic and prosodic categories apply to lexical syntactic elements and their projections, but not to functional elements and their projections, or to empty syntactic elements and their projections.

The next section attempts to provide an analysis for the domain of floating L tones.

5. Analysis

In this section, I will argue that floating L tones in Kikuyu appear at the right edge of a p-phrase. Data in the sections above strongly suggest that floating L tones do not trigger downstep between a head and a complement. More specifically, no downstep intervenes between a noun and a right-adjacent modifier. This pattern is attested when a postnominal modifier follows the head noun. In (18), the noun \(\text{m`ond`o}\) has a lexical L underlyingly. Because downstep is not triggered, L has clearly been deleted. Other examples with this pattern is (2) and (3) from section 1.

(18) \(/\text{mond`o\ L\ mok`or`o}/\)

Evidence for an underlying L in m`ond`o in (18) comes from (19) where a verb follows instead of a modifier. This triggers downstep on the initial syllable of the verb (subject prefix `a-`). This shows that the lexical L does not get deleted when a verb follows. Similar examples where downstep appears either after the subject noun or on the following verb or on a coordinator were given in (1), (11b), (12b) and (13).

Regarding the vP, (19) also shows that no downstep appears between a verb and an object. There is an assertive Lar in the verb of (19) which does not trigger downstep on its following object. Instead it appears after the object where it blocks NON-FINALITY. Evidence for this is that the rising tone of m`o`bak`e is retained. This noun has no lexical L and without a preceding verb the rising tone would have been lowered. This tone process applied in (4) (section 1)
with the noun ṭombê. As for (19), the expected form would be: [mô-ꜣakê] if no floating L tone followed. Thus, NON-FINALITY is blocked. The tone which blocks NON-FINALITY is the assertive (l) of the verb which has shifted and appears after the object noun. This is represented in (20).

(19) /mondô(l) ṭar:handirô(mô)kê/
    mô-ndô  ṭar-:hand-irô  mô-ꜣakê
    1-person SM-NPST-plant-PFV.FV 3-tobacco.plant
    ‘The person planted a tobacco plant.’

(20) /mondô(l) ṭar:handirô moṣkê(l)/
    Intermediate underlying form

If no object follows but rather a subordinate clause, downstep is triggered on the conjunction. This was already shown in (13) above and is repeated below in (21). This gives evidence for the claim that the assertive (l) is domain-sensitive in that it does not simply shift and appear after any following item. Instead it triggers downstep on a following item which is not a complement, like a subordinate clause.

(21) /mwânekê(l) ṭi:sêriâ(mô)bê(l) moṣêrânía ũeînê wâ ṭombê/
    mwânêkê ṭi-sêri-â ũê-nds-irê  mó-ỹêrânía ũeînê wâ ṭombê
    Mwanîki SM-think-FV that FM SM-see-PFV.FV 1-examiner inside CONN 9.house
    ‘Mwanîki thinks that I saw the examiner inside the house.’ (Clements & Ford 1981:327)

Example (7) from section 2.1, repeated in (22), shows a transitive clause with the adjunct ṭowa: which is subject to downstep. The underlying assertive (l) (or the lexical (l) of ṭombê) trigger downstep on the first syllable of the adjunct. A similar pattern is also attested in the previous examples; (4) and (6).

(22) /ndêrâyôrîrî(mô)bê(hwâ:)/
    ndê-râ-yôr-irê  mô-bê  ṭwa:    SM-NPST-buy-PFV.FV 9.cattle yesterday.evening
    ‘I bought cattle yesterday evening.’

The data indicates that downstep appears at the edge of a domain which corresponds to the p-phrase. For the distribution of downstep, I propose the generalization in (23).

(23) The two floating L tones in Kikuyu: lexical (l) and assertive (l) are domain-sensitive and trigger downstep at the right edge of a p-phrase. P-phrase medial, no downstep is triggered.

The projections DP, vP, TP, CP etc. have been omitted in (24) as they are functional projections and therefore irrelevant for the p-phrase boundaries. What we see is that every maximal projection which is lexical will trigger a p-phrase boundary. Here, downstep is triggered depending on whether there is a floating L tone underlyingly or not. Within the p-phrase, no downstep will be triggered. The positioning of downstep indicates that it is the right edge of an XP which triggers a p-phrase boundary in Kikuyu. If it were the left edge of an XP which would trigger a p-phrase break, it would be expected to find downstep between the verb and the object as in (25).

Instead the pattern that was shown in (19) (along with other examples) is found where no downstep intervenes between a verb and following object. Since (25) is not attested in Kikuyu, neither in data from Clements & Ford (1981), Clements (1984b) nor in my own data, it can be concluded that it is the constraint ALIGN-XP,R which applies for Kikuyu. Another constraint which applies is *P-PHRASE (26) and is part of the constraint family *STRUC (cf. Prince & Smolensky 1993).

Tableau 1 below shows the phrasing for (19) (repeated here as (28)).

<table>
<thead>
<tr>
<th></th>
<th>[mόndο][NP]</th>
<th>[ʼa-ráː-hánd-irɛ][VP]</th>
<th>[mόb-ąkɛ][NP]</th>
<th>ALIGN-XP, R</th>
<th>*P-PHRASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>( )ₚ ( )ₚ ( )ₚ</td>
<td>( )ₚ ( )ₚ ( )ₚ</td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>b.</td>
<td>( )ₚ</td>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>c.</td>
<td>( )ₚ ( )ₚ</td>
<td>( )ₚ</td>
<td>*!</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>( )ₚ</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

Tableau 1: ‘The person planted a tobacco plant.’
In tableau 1, the NP of the subject and the one of the object are lexical XPs which trigger a p-phrase boundary. ALIGN-XP,R demands a p-phrase boundary after these two XPs. The candidates in (c) and (d) do not have this: (c) lacks a p-phrase boundary after the subject NP and (d) lacks two p-phrase boundaries as all the constituents have been phrased together. The p-phrase boundary after the verb in (c) does not satisfy ALIGN-XP,R because the verb alone is not an XP and does therefore not trigger a p-phrase boundary. In candidate (a), the subject, the verb and object have all been phrased separately while in candidate (b), the subject forms one p-phrase while the verb and the object form another. Both these candidates satisfy ALIGN-XP,R because there is a p-phrase boundary after each NP. The constraint which determines the winner is therefore *P-PHRASE which prefers (b) over (a) because the former has less p-phrases. Ranking ALIGN-XP,R over *P-PHRASE is necessary to predict the right phrasing pattern in Kikuyu. If ALIGN-XP,R would be ranked below *P-PHRASE, then candidate (d) would win. Such a phrasing pattern would predict that no downstep appears after the subject NP. As this is however the case, the ranking in (27) predicts the correct phrasing pattern for Kikuyu.

Tableau 2 derives the phrasing pattern for the sentence in (7), repeated again in (29), which has an adjunct following the primary object. There are two (lexical) XPs: the NP of the object and the Adverbial Phrase of the adjunct.

SM-NPST-buy-Pfv.FV 9,cattle yesterday.evening
‘I bought cattle yesterday evening.’

<table>
<thead>
<tr>
<th></th>
<th>I-bought cattle</th>
<th>yesterday, evening</th>
<th>ALIGN-XP, R</th>
<th>*P-PHRASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( ) φ ( ) φ ( ) φ</td>
<td>*! ***</td>
<td>*! ***</td>
<td></td>
<td>***!</td>
</tr>
<tr>
<td>b. ( ) φ ( ) φ</td>
<td>*! **</td>
<td>*! **</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>c. ( ) φ ( ) φ</td>
<td>*!</td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d. ( ) φ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tableau 2: ‘I bought cattle yesterday evening.’

Candidate (b) and (d) both violate ALIGN-XP,R as there is no p-phrase boundary after the object NP ñòmbè. In (b), both the object NP and the AdvP form a single phrase. In (d) the whole clause forms a single p-phrase including the verb, the object NP and the AdvP. Candidate (c) and (a) both fulfill ALIGN-XP,R as there is a p-phrase boundary after each XP. As in tableau 1, *P-PHRASE determines the winner which is (c) because there are less p-phrases than in (a).

The remaining phrasing pattern to be evaluated is the DP with a noun and a following modifier (18) (repeated in (30)). I assume that the adjective is embedded inside the NP.

(30) /mondò [L] mòkèrò/ mò-ndò mò-kèrò... 1-person 1-old ‘old person’
Tableau 3: ‘old person’

In tableau 3, only two phrasing patterns are possible. In (a), the head and the modifier form separate p-phrases while in (b), they form one p-phrase. Since the adjective is embedded in the NP, both candidates satisfy ALIGN-XP, R as there is a p-phrase boundary after the NP/AP. *P-PHRASE determines the winner preferring the candidate with fewest p-phrases which is candidate (b). This formation of p-phrases implies that no downstep will occur between the head noun and the following modifier. This prediction is borne out.

The derivation in the tableaux 1-3 generated a pattern conform with the generalization in (23) stating that downstep appears on the right edge of a p-phrase while no downstep appears inside a p-phrase. The two floating L tones are different in fulfilling the predictions of (23). While the lexical L will be deleted, the assertive L will shift in order to avoid triggering downstep in a position which deviates from the right edge of a p-phrase. Thus, the surface tones of lexical L and assertive L can be accounted for if p-phrases is the prosodic domain which they are sensitive to and they are determined by the ranking ALIGN-XP,R << *P-PHRASE. The reader should note that this analysis only predicts in which position downstep is not triggered (p-phrase medial) and it does not predict whether downstep will actually be triggered on the right edge of a p-phrase because this depends on two conditions: (i) whether there is a floating L tone underlingly, and (ii) the surrounding tones. To conclude the section, the third cue of underlying floating L tones will be discussed (cf. section 2) which is unbounded HTS. In section 2.3, example (10b), repeated as (31) below, demonstrated how unbounded HTS applies in correlation with a floating L tone. In this example, the floating L tone triggers downstep in a position which only partly depends on p-phrases. The other determining factor is the surrounding tones. Following Gussenhoven (2004), I assume that H(#)\textsuperscript{L} is banned in Kikuyu. Therefore, a floating L tone (either lexical or assertive) will move to the right when being preceded by a H tone and followed by a L tone to prevent triggering downstep in this position. This is an independent tone restriction and in a different tone sequence of the same syntactic configuration, a floating L tone would trigger downstep according to ALIGN-XP,R. This is shown in (32) where a floating L tone on a p-phrase edge is in a L tone sequence. Here downstep is triggered as expected.

(31) /ndɛràːrɔːiriː(\textsuperscript{L})\ ηàná\ nà \jzɒ\ \jvà\N\ \jvà\ onà\ Unbounded HTS with (\textsuperscript{L})

\textsuperscript{13} A full analysis of the two floating L tones as well as their interaction with and HTS is discussed in the author’s MA thesis (2015) where the pattern is accounted for in a Stratal OT analysis.

\textsuperscript{14} The noun mbɔrî should have a final floating L tone according to the description of Armstrong which predicts that it should be H-final (NON-FINALITY is blocked). The southern Kikuyu speaker of this study however showed variation for this pronouncing it L-final (indication of no lexical (\textsuperscript{L})).
Phonological Phrases in Kikuyu

(32) /ndërákàmírũ:mbũ nà mbörü/ õnd`e-ři:n`a mb`or`ũ/
   Downstep in a L tone sequence
   SM-NPST-milk-PFV.FV 9.cattle and 9.goat
   ‘I milked cattle and goat.’

ALIGN-XP,R predicts a p-phrase boundary after the first conjunct (p`ũmbũ) This shows that examples like (31) do not deviate from the analysis, but rather the tone context must be considered. I propose the generalization formalized in (33). This generalization implies that a floating L tone which is positioned at the right edge of a p-phrase will either trigger downstep or, if it is preceded by a H tone and followed by a L tone, unbounded HTS applies. The difference depends on the surrounding tones. The crucial point here is that the constituent which is subject to unbounded HTS belongs to another p-phrase and this is a tone effect which has been induced by a floating L tone in a H-L sequence.

(33) A lexical or an assertive floating L tone in Kikuyu only induces a tone change (downstep, unbounded HTS, or blocking of NON-FINALITY) at a p-phrase boundary. P-phrase internal, a floating L tone does not interact with other tones.

The next section examines the phrasing pattern of nominal modifiers and attempts to account for some apparent contradictory data.

6. Phrasing pattern with modifiers

The proposed analysis from the previous section predicts that embedded modifiers within an NP (of a DP) will form a p-phrase together with the head noun. The phrasing of a noun and a following adjective was shown in (30) where they formed one p-phrase. The same phrasing pattern is expected for a verb and its primary object which itself is modified by an adjective or other determiners. (34) below shows this kind of configuration. Here, there are several floating L tones but they only induce two tone processes: (i) Triggering of downstep which appears on the initial tone of hwâzé; (ii) Blocking of NON-FINALITY of the underlying H tone of the adverb (induced by the final lexical L.) It is unclear which of the first three floating L tones triggers downstep but for the analysis, this is not a determining factor. What is important is the absence of downstep within the p-phrases and the presence of downstep at the right edge of a p-phrase.

   noun – adjective} as object
   SM-PST;see-PFV.FV 1-farmer 1-heavy yesterday.evening
   ‘I saw the heavy farmer yesterday evening.’

The structure of (34) is given in (35). The NP with the head noun mòrëmitõ triggers a p-phrase boundary. The adjective mòritõ is assumed to be either in a complement position of the noun or adjoined inside the NP and therefore, no p-phrase boundary is predicted between the noun and the adjective.
Example (2) in section 1, repeated below in (36), shows a phrase consisting of a noun, a possessive and a following adjective. Here, the lexical \( \mathbf{L} \) of the noun \( \eta\text{omb}\) gets deleted when a modifier follows. Because the possessive does not have a lexical \( \mathbf{L} \), there is no indication of whether the adjective phrases together with the noun and the possessive or whether it phrases alone. It is only clear that the noun and the possessive phrase together, because if they did not, the lexical \( \mathbf{L} \) of \( \eta\text{omb} \) would trigger downstep on the possessive.

(36) \( \eta\text{omb} \) yâk\' \( h\text{or}r\text{i}/ \)
\( \eta\text{omb} \) yâ-k\' \( h\text{or}r\text{i} \)
9.cattle 9-3SG gentle
‘his gentle cattle’

In order to see whether the adjective forms a p-phrase together with the noun and the possessive, it has to follow a verb because unlike the lexical \( \mathbf{L} \), the assertive \( \mathbf{L} \) will not get deleted but will shift to the right edge of a p-phrase. In (37), the same modifier structure appears as in (36) but as an object following an assertive verb. What can be observed is that the adjective is subject to unbounded HTS (compared to the adjective in (36) which undergoes binary HTS). As shown in section 2.3 (and discussed in the end of the previous section), this is a cue of an underlying floating L tone which must have preceded the adjective in order for the unbounded HTS to apply on the adjective (cf. Philippson 1991). This indicates an intermediate step in the derivation where the lexical \( \mathbf{L} \) tone of \( \eta\text{omb} \) has been deleted and the assertive \( \mathbf{L} \) is placed in front of the adjective. Here, it triggers unbounded HTS because it appears between a H and a L tone. The intermediate step is given in (38).

(37) \( \text{nd\'onir} \) \( \eta\text{omb} \) yâk\' \( \text{ndit}o/ \)
\( \text{nd\'onir} \) \( \eta\text{omb} \) y-\( \text{ak} \) \( \text{ndit}o \)
\( \text{SM-CURR} \text{PST}; \text{see-PFV.FV} \) 9.cattle 9-3SG heavy
‘I saw his heavy cattle.’

(38) \( \text{nd\'onir} \) \( \eta\text{omb} \) yâk\’ \( \text{ndit}o \).

As was argued in section 5, the positioning of downstep depends on the surrounding tones. Therefore, it can be assumed that if the adjective in (37) was preceded by a L tone instead of a H, downstep would be triggered on the initial syllable of the adjective. The p-phrase structure of (37) is shown in (39) where the adjective forms a separate p-phrase.

(39) \( \text{nd\'onir} \) \( \eta\text{omb} \) yâk\' \( \text{ndit}o \).

Another configuration in which the adjective phrases alone is when it follows another postnominal adjective. This was shown in the introduction in (3) and is repeated below in (40) with the full sentence. The underlying tones of \( \text{ndit}o \) are LL\( \mathbf{L} \) and downstep is triggered on the follow-
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ing adjective. This indicates that the second modifying adjective forms a separate p-phrase.16

(40) /ŋəmbè(ŋ) ndìtò(ŋ) hàrètì(ŋ) éré déínè wá pómðà/
(ŋəmbè ndìtò) (hàrètì) (éré déínè wá pómðà)

9.cattle 9.heavy gentle COP.PL inside CONN 9.house
‘A heavy gentle cattle is inside the house.’

The phrasing pattern of modifiers has been discussed for Chichewa in Downing & Mtenje (2011). In this language, every nominal modifier triggers a prosodic phrase except for clitic-like modifiers. This is not a regular pattern in Kikuyu. The phrasing pattern seems to depend on both the syntactic position and the number of modifiers that follow. From the available data, it seems that the first modifier always phrases together with the noun while a second following modifier will either form a separate phrase or it will phrase together with the noun and the preceding modifier. For the adjective, I argue that the fact that it forms a separate p-phrase is due to its properties as a modifier, and not to the fact that it follows another modifier. If a non-adjectival modifier follows a noun and a possessive, it should be possible that all three words form one p-phrase, depending on the syntax of this modifier/determiner. This prediction is born out in (41).

Here, a head noun is followed by a possessive, a numeral and an adjective. The possessive and the numeral are not affected by floating L tones because downstep is not induced on any of their tones. If the numeral would have been affected here, it would have the surface tones kómw čé.17

Because it does not have these surface tones, it can be assumed that the lexical floating L tone of yùkɔ has been deleted and the assertive (L) shifts affecting only the adjective yòdòkù. This adjective is subject to downstep on the final underlying H tone and the preceding L tones are raised to H. Its underlying tones have changed from LLH to HH⁺H in order to avoid downstep between a H and a L tone. According to the generalization (33), the fact that the adjective undergoes a tone process triggered by (L) indicates that it forms a separate p-phrase.

(41) /ndɔ:nirè(L) yùkɔ(L) ywàkè komwè(L) yóòdòkù rémwè(L)/
‘I saw his one bad arm once.’

(Clements & Ford 1981:329)

It will now be discussed why adjectives form separate p-phrases in Kikuyu. Firstly, the possibility that this phrasing pattern is a matter of maximal prosodic length can be excluded. A prosodic constraint such as BÌNMAX (cf. Selkirk (2000)) which penalizes p-phrases which are longer than two prosodic words does not apply for Kikuyu. Evidence for this is the sentence in (34) above where three prosodic words: verb, noun and adjective, form one p-phrase.

Another explanation regards the syntax of adjectives following a head noun and other modifiers. Regarding the configurations in (36)/(37) with a noun followed by a possessive and an adjective, the first question which arises is what the structure of the possessor is. The morphology of possessors in Kikuyu is composed by a connective article, which agrees with the head none in gender, and a stem as shown in (42).

---

16 The lexical/grammatical tones of the plural copula is not listed in the literature but based on the recordings, I assume that they are underlying H and undergo downstep (induced by the lexical (L) of hàrètì).

17 The final tone of kómwè is lowered due to a separate rule.
The connector (ya- for class 9) can also be used alone to connect phrases as in (43a). In (43b) the possessive association has been pronominalized by ke.

(43)  

a.  pongo ya-soso  
   9.pot  9.CONN grandmother  
   'grandmother’s pot'  

b.  pongo ya-ke  
   9.pot  9.CONN-3SG  
   'her pot'  

(Mugane 1997:98)

This possessive construction is found in many other Bantu languages and Hyman et al. (2013) give the structure of a connective phrase (44).

(44)  

[ConnP [NP ] [Conn' [NP ]]]  

(Hyman et al. 2013)

I assume that the configurations shown in (42) and (43b) have a similar structure as in (44). Here, the noun (the complement of ConnP’) is replaced with a pronoun (the stem -ke) which fuses with the connective particle ya-. In this construction, the N head takes a ConnP as a complement. The ConnP then consists of the fused connective particle and the stem. The structure is given in (45). This structure predicts that there is no internal p-phrase boundary between the noun and the possessive.

(45)

The interesting question is in which syntactic position the adjective is when it follows other modifiers. The word order of the NP gives some indication of this. In Kikuyu, the order of the modifiers is relatively fixed and reordering can lead to dislocation. There are several indications of the adjective having a more remote syntactic position compared to the other modifiers. The linear (neutral) order of modifiers in the DP is in (46). The canonical position of the adjective is at the right periphery of the DP. An example is given in (47).

---

18 All examples from Mugane have been changed to IPA.
If the order of the modifiers is changed, an intonation break is needed. In (48a) the noun is omitted and the modifiers are anaphoric. The adjective still appears at the right periphery. In (48b), the order is changed and the adjective is no longer in this position. This induces a comma intonation (Mugane 1998:39). The same can be observed in (49) where the adjective has been moved to a position immediately adjacent to the noun while the possessive follows. This also results in a comma intonation. This intonation pause indicates syntactic dislocation of the possessive. The neutral order was given in (42). This suggests that the syntactic position of the adjective is relatively fixed outside of the projection heading the noun and the possessive. In order for the adjective to be linearly adjacent to the noun, the possessive has to be dislocated outside this projection.

Another indication of the fixed syntactic positioning of the adjective in Kikuyu regards compounds. Other modifiers such as demonstratives have a less fixed position in that they can prepose the noun. In this position, they modify the head of a compound. Adjectives on the contrary, cannot modify the head of a compound alone as seen by the ungrammaticality in (51a). In this configuration they must follow the compound (51b).\textsuperscript{19} In this position they modify the whole compound.

\textsuperscript{19} Mugane (1997) annotates the class 1 prefix mo- as \textit{AGENT} but this is omitted here for the sake of consistency.
Turning back to the phrase with a noun and two adjectives as shown in (40), the speakers for this study produced the following order: ɬɨmbɛ nδɨtɔ ‘hɔrɛtɬ ‘a heavy gentle cattle’. With a reversed order of the adjectives, the sentence was judged ungrammatical with the explanation that nδɨtɔ ‘heavy’ describes a property of the noun in a larger scale than the adjective hɔrɛtɬ ‘gentle’ does. The fact that nδɨtɔ must be positioned immediately after the noun indicates that this position is reserved for adjectives which are semantically more closely connected to the head. This difference could be interpreted as an alienable/inalienable distinction of modifiers.  

(52) *ɬɨmbɛ hɔrɛtɬ ɬɪdɪtɔ ‘ɛrɛ ɬeɪnɛ wá pɔmɓा  
9.cattle 9.heavy gentle COP.PL inside COP.PL 9.house  
‘A gentle heavy cattle is inside the house.’

The fact that the adjective which is semantically further away from the noun cannot be adjacent to it and also phrases separately is an interesting fact. A somewhat similar phenomenon is attested in Ojibwe. This languages attests phase-sensitive phonological processes. Regarding modifiers, there is avoidance of obstruent-nasal sequences. Two different strategies are employed in possessive constructions depending on whether it is an alienable possessive construction or an inalienable one. In the latter case, consonant deletion applies (argued to be phase-internally), while in the former case, the nasal assimilates to the preceding obstruent (noun and possessor interpreted between different phases) (Newell & Piggot 2014). A similar phenomenon is also attested in the Dogon languages where tone overlay is sensitive to the alienable-inalienable distinction of constituents in the DP (McPherson & Heath 2015). Another language where adjectives form a separate p-phrase is the Bantu language (P23) Sımákonde (Manus 2010). This language has a phrase-final stress rule where the penultimate syllable of every prosodic phrase is lengthened. The phrasing pattern with nominal modifiers is similar to Kikuyu in that a nominal modifying possessive forms a prosodic phrase with the noun while an adjective phrases separately. Optionally a possessive can phrase separate from the noun but the adjective can not phrase together with the noun. When a noun is followed by a possessive and an adjective, the noun forms a prosodic phrase with the possessive and the adjective phrases alone (Manus 2010).  

Although the DP structure of Kikuyu needs more investigation, the data shown in this section gives some indication that adjectives are syntactically higher than other nominal modifiers. The main indicator of this is that they have a fixed position at the right periphery of the DP. As for configurations where two adjacent adjectives follow a noun, there is only semantic and prosodic evidence which can indicate their syntactic position. Based on this, I propose that a modifier which follows the head noun is either in a complement position or adjoined within the NP. Indication for this is that adjectives which are semantically close to the head must stand in this position. When adjectives follow a head and another modifier (either another adjective or another modifier), it is possible that it is adjoined to a projection above the NP. Regarding the possessive, the structure was given above in (45) where a head noun of the NP selects a connective phrase headed by the possessive with the connected ɣa- as the head which again selects either a NP as a complement or a pronoun. In the latter case it will be a stem such as -kɛ.

---

20 Again there is optionality in the phrasing pattern so that when there are more modifiers each modifier can also constitute a separate prosodic phrase.
The adjective which linearly follows the possessive is assumed to be adjoined to the NP of the noun or to another projection above it. This NP triggers a *p*-phrase boundary and the separate phrasing of the adjective follows from this. The possessive is embedded as a complement to the head noun and therefore no *p*-phrase boundary is triggered.

The phrasing patterns are generated with the constraint ranking ALIGN-XP, R << *P-PHRASE from section 5.

<table>
<thead>
<tr>
<th>nd-ɔm-irɪ</th>
<th>[ŋёнmbɔ]</th>
<th>ConnP</th>
<th>ɡà-kɛ</th>
<th>NP</th>
<th>ndɪtɔ</th>
<th>AP</th>
<th>ALIGN-XP, R</th>
<th>*P-PHRASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-saw</td>
<td>cattle</td>
<td>POSSE</td>
<td>heavy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>****!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>***!</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
</tbody>
</table>

Tableau 4: ‘I saw his heavy cattle.’

Tableau 4 shows the example from (37). The NP boundary is after the possessive because it is embedded in this projection. Candidate (b) has all four constituents included in one *p*-phrase. This only violates the lower-ranked *P-PHRASE constraint one time but violates the undominated constraint ALIGN-XP, R because no *p*-phrase boundary is formed after the NP of the head noun. Candidate (d) and (e) also violate ALIGN-XP, R. Candidate (c), (a) and (f) all have a *p*-phrase break after the NP boundary. The lower-ranked constraint *P-PHRASE prefers (f) as this has fewest *p*-phrases.

<table>
<thead>
<tr>
<th>[ŋёнmbɔ]</th>
<th>ndɪtɔ</th>
<th>AP</th>
<th>[‘hɔrɛrɛ]</th>
<th>AP</th>
<th>ALIGN-XP, R</th>
<th>*P-PHRASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>cattle</td>
<td>heavy</td>
<td></td>
<td>gentle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>***!</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>()</td>
<td>()</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
</tbody>
</table>

Tableau 5: DP ‘A heavy gentle cattle.’

Tableau 5 shows the example in (40) with two adjectives following a noun. There are two XP boundaries of lexical nature which follow the adjective ndɪtɔ. These are AP of hɔrɛrɛ and NP of the head noun (together with AP of ndɪtɔ itself). Candidate (b) and (d) are therefore ruled out by ALIGN-XP, R. The winner is (c) which has fewest *p*-phrases. The suggested constraint ranking generates the correct *p*-phrase pattern in Kikuyu where a nominal modifier which is right-adjacent to the noun phrases with it, and a following adjective phrases alone.
7. Summary

This paper presented new data on tone in Kikuyu and proposed a unified analysis for the surface pattern of two different floating L tones. As previous studies have shown, the lexical \( \text{L} \) and the assertive \( \text{L} \) are both domain-sensitive. This study proposed that their domain of application is the p-phrase. The floating L tones can trigger a downstep, block NON-FINALITY or trigger unbounded HTS depending on the surrounding tones. The proposed analysis predicted that these three tone processes only apply at the right edge of a p-phrase. The p-phrases were determined by the ranking \text{ALIGN}-\text{XP, R} \ll \#\text{P-PHRASE}. This constraint ranking generated a p-phrase boundary after each maximal projection of lexical constituents. The analysis has accounted for the data of SVO(Adv) sentences and DPs with one modifier. As for more complex DPs, an apparent contradiction to the analysis was discussed where an adjective phrases alone when following another nominal modifier. It was shown that this pattern is also conform with the p-phrase analysis when the syntactic position of such adjectives is taken into account.

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